THE SPOTTED alfalfa aphid

HOW TO CONTROL IT

LEAFLET NO. 422

U. S. DEPARTMENT OF AGRICULTURE

THE SPOTTED *alfalfa aphid* HOW TO CONTROL IT

The spotted alfalfa aphid [1] is one of several kinds of aphids that attack alfalfa, clover, and other forage legumes. It damages alfalfa by sucking juice from the leaves and stems.

This insect is a pest of alfalfa in 34 States. It is especially destructive in States west of the Mississippi. It has been known to cause damage totaling more than $40 million in a single year.

You can control the spotted alfalfa aphid by applying an insecticide or by planting a variety of alfalfa that is resistant to the insect.

APPEARANCE

Spotted alfalfa aphids are pale yellow and have six or more rows of black spots along their backs. They are about one-sixteenth inch long.

The spotted alfalfa aphids commonly seen on alfalfa are female adults and their wingless young (nymphs). Males are rarely seen.

Most female adults are wingless. Those that are winged have smoky areas along the veins of the wings.

A winged adult, a wingless adult, and a nymph are illustrated in natural color on page 5.

DEVELOPMENT

Female spotted alfalfa aphids usually reproduce without mating, and give birth to living young. Each female produces 25 to 100 nymphs. In warm weather a female produces a nymph about every 6 hours. Activity is slowed by cold weather, but the female can reproduce during warm winter days.

Nymphs mature in 1 or 2 weeks when temperatures are high and in 3 or 4 weeks when the weather is cool. There may be 20 or more generations a year.

In the fall of 1960, true sexual forms of the aphid were found in an area in Nebraska. After mating, the females laid eggs which survived the winter and hatched the following spring.

Since 1960 these egg-laying forms have been found over a much larger part of Nebraska and in small areas in South Dakota, Kansas, and Wisconsin. This indicates that over-

[1] *Therioaphis maculata.*

wintering in the egg stage may become common in the North Central States. Adults or nymphs have not overwintered in the northern part of their range in the United States, though they are capable of surviving temperatures below freezing.

DAMAGE

Both the adults and the nymphs suck juice from alfalfa leaves and stems. The first sign of their feeding, seen in young alfalfa, is a whitening of the veins of the leaves. Continued feeding causes the leaves to curl, turn yellow, die, and drop. In addition to feeding, the aphids inject a poison into the plants. This quickly kills seedlings, and it either stunts or retards the growth of older plants if it does not kill them.

Severely infested plants are defoliated: only a few leaves remain near terminals of the branches. The loss of leaves reduces hay and seed yields.

Whitened veins of leaves are a sign of early feeding by the spotted alfalfa aphid. (Courtesy of Capper's Farmer.)

Aphid infestation thins a stand of alfalfa and shortens its life. The thinned stands are easily invaded by weeds, and the weakened plants are less able to withstand the attacks of injurious soil fungi on the roots. A severe infestation of aphids may ruin the stand. After the cutting of an infested stand, regrowth does not occur, or it is retarded.

Spotted alfalfa aphids usually feed on undersurfaces of leaves on the lower parts of the plant. In heavy infestations, they also feed on upper surfaces of leaves, on buds, and on stems. In warm weather aphids are active and move readily from one plant to another. Winged adults migrate from field to field. The aphids have the habit of jumping or dropping to the ground when infested plants are disturbed.

Spotted alfalfa aphids secrete sticky honeydew that interferes with cutting, drying, and baling infested alfalfa. A black mold thrives on the honeydew, discoloring the plant and lowering the quality of hay.

PLANTS AFFECTED

The spotted alfalfa aphid causes extensive damage only to alfalfa. However, it feeds readily on burclover, black medic, and sourclovers. It also feeds on crimson clover, button clover, berseem clover, yellow-blossom sweetclover, and alsike clover. It can exist on several other legumes. This aphid does not care for red clover, Ladino clover, white Dutch clover, rose clover, subterranean clover, lespedeza, common vetch, purple vetch, birdsfoot trefoil, sesbania, or other sweetclovers.

Alfalfa plant damaged by spotted alfalfa aphids. Soil around the plant is discolored by honeydew excreted by the aphids.

WHEN TO APPLY INSECTICIDE

Start looking for aphid infestation as soon as alfalfa seedlings are out of the ground. Examine plants in various parts of the field. If you find an average of ½ to 1 aphid per seedling, apply an insecticide. If you find any aphids in the field, or if you know that they are in neighboring fields, it will pay you to examine your alfalfa every few days.

On older alfalfa, grown for hay or seed, watch for aphids and honeydew on the plants. Look on the undersurfaces of leaves, especially on lower parts of the plants. Go through your field and examine about 20 plants. If there is an average of 20 or more aphids per stem and honeydew is noticeable, apply an insecticide.

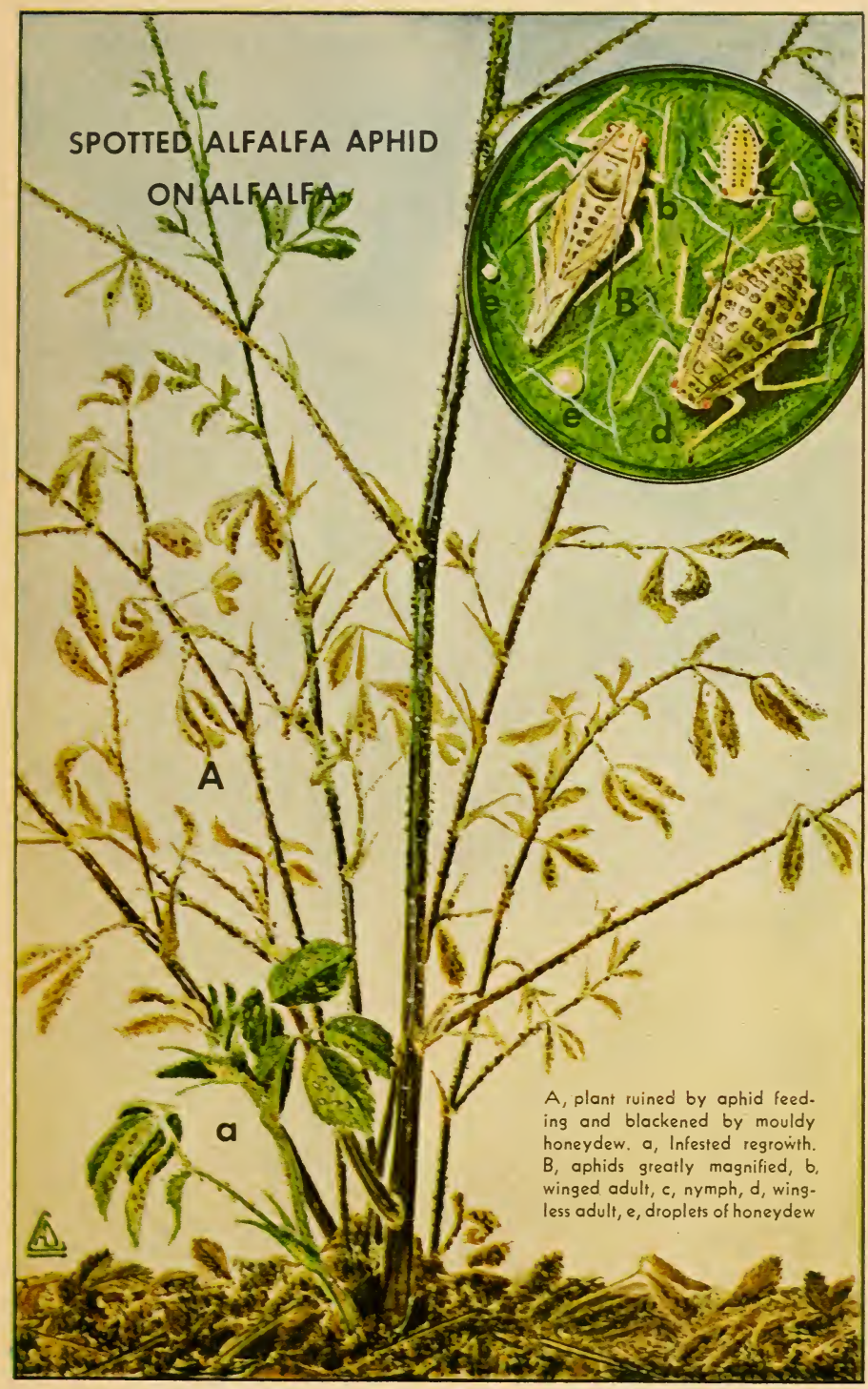
HOW TO APPLY INSECTICIDE

Apply an insecticide in a spray, using either ground equipment or an airplane.

Be sure that all alfalfa in the field is treated; any left untreated will harbor aphids that will reinfest treated alfalfa.

Insecticide is most effective if applied when the temperature is above 60° F.

You may spray alfalfa with demeton, diazinon, malathion, parathion, or Phosdrin. Of these, demeton is the least harmful to insect polinators and to predators and parasites of the spotted alfalfa aphid.



A, plant ruined by aphid feeding and blackened by mouldy honeydew. a, Infested regrowth. B, aphids greatly magnified, b, winged adult, c, nymph, d, wingless adult, e, droplets of honeydew

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If your equipment has been used previously for applying a herbicide, clean it thoroughly before applying an insecticide.

If you use ground equipment, adjust it to apply spray at the rate of 12 or more gallons per acre; if you use an airplane, as little as 2 gallons per acre is sufficient.

Prepare a spray by mixing an emulsifiable concentrate with enough water to give the recommended per-acre dosage of *active ingredient*. The amount of water will be determined by the rate at which your equipment distributes spray. For example: If your equipment is adjusted to distribute 12 gallons of spray per acre, and the recommendations specify 8 ounces of active ingredient per acre, you should mix the required amount of emulsifiable concentrate to provide 8 ounces of active ingredient with enough water to make 12 gallons of finished spray for each acre to be treated.

The recommended dosages are as follows:

Insecticide	*Amount of active ingredient to apply per acre*
	Ounces
Demeton	4
Diazinon	8
Malathion	10
Parathion	4
Phosdrin	2

PRECAUTIONS

Insecticides are poisonous to man and animals. Use them only when needed and handle them with care. Follow the directions and heed all precautions on container labels. Read the label each time you use an insecticide; do not depend on your memory.

Keep insecticides in closed, well-labeled containers in a dry place where they will not contaminate food or feed and where children or pets cannot reach them.

Avoid repeated or prolonged contact of insecticides with the skin; avoid inhalation of dusts or mists. When handling insecticides, wear clean, dry clothing; wash hands and face before eating or smoking.

When handling concentrates avoid spilling them on skin or clothing, and keep them out of the eyes, nose, and mouth. If any is spilled, wash it off the skin and change clothing immediately. If it gets in the eyes, flush with plenty of water for 15 minutes and get medical attention.

Parathion, demeton, and Phosdrin are extremely poisonous and may be fatal if swallowed, inhaled, or absorbed through the skin. Be certain that the person who applies them is thoroughly familiar with their hazards, and will assume full responsibility for using them safely and complying with all precautions on the label. Wear a respirator of a type tested by the U.S. Department of Agriculture and found satisfactory for protection against the particular insecticide being used. A current list of acceptable respiratory devices is available from the

Entomology Research Division, Agricultural Research Service, Beltsville, Md., 20705.

After applying one of the following insecticides, wait the indicated number of days before harvesting or grazing alfalfa: Demeton, 21 days; diazinon, 7 days; parathion, 15 days; Phosdrin, 1 day. **No waiting period is required for malathion.**

To avoid killing honey bees and other pollinating insects, apply insecticides only when these insects are not visiting the plants. Diazinon, malathion, parathion, and Phosdrin are very toxic to bees. Do not apply these materials to alfalfa in bloom unless it is absolutely necessary and then only in the evening after the bees have left the field. Notify beekeepers at least 48 hours before spraying large acreages so that measures can be taken to protect the bees.

To protect fish and wildlife, do not contaminate lakes, streams, or ponds with insecticides. Do not clean spraying equipment or dump excess spray near such waters.

Avoid drift of insecticide sprays to nearby crops or livestock. Do not allow poultry, dairy animals, or meat animals to feed on plants or drink water contaminated with insecticides.

NATURAL CONTROLS

Predators

Several insects feed on and kill the spotted alfalfa aphid. Usually they do not destroy enough aphids to control a serious infestation and prevent crop damage, but they may hold down light infestations and delay reinfestation after an insecticide application.

Adults and larvae of lady bettles are important natural enemies of aphids: the convergent lady bettle (*Hippodamia convergens*) is the most abundant. Larvae of syrphid flies and lacewing flies sometimes devour large numbers of spotted alfalfa aphids. Damsel bugs, big-eyed bugs, pirate bugs, and predaceous beetles and spiders destroy many aphids.

Parasites

Native insect parasites of aphids in the United States have not commonly attacked the spotted alfalfa aphid. Therefore, three kinds of small wasps that parasitize aphids in Europe and Asia were imported, reared in large numbers, and released in infested States. They have become established in several States. Reports on two of these parasite species in certain areas of California and Arizona indicate that these parasites will be of considerable value in the control of the spotted alfalfa aphid.

Diseases

Fungus diseases attack the spotted alfalfa aphid in some areas, especially during wet spells or following irrigation. Under these conditions, and in the more humid areas of the country, fungus diseases may be of assistance by killing large numbers of aphids.

RESISTANT VARIETIES

Growing alfalfa varieties that are resistant to the spotted alfalfa aphid will reduce the damage

caused by this insect. Five such varieties are currently available.

Lahontan alfalfa was developed for resistance to other pests, but it is also resistant to the aphid. This variety of alfalfa was released in 1954 by the U.S. Department of Agriculture and the Nevada and California Agricultural Experiment Stations for use in infested areas of Arizona, California, and Nevada where moderately hardy varieties of alfalfa are grown.

A resistant, nondormant variety named Moapa was released in 1957 by the U.S. Department of Agriculture and the Nevada, Arizona, and California Agricultural Experiment Stations. It is adapted to the arid, irrigated areas of the Southwest.

The New Mexico Agricultural Experiment Station released Zia alfalfa in 1958 for use in the infested areas of New Mexico.

Cody alfalfa was developed by the Kansas Agricultural Experiment Station and the U.S. Department of Agriculture and released in 1959. It is moderately hardy and is adapted to a 400-mile-wide belt extending from the Atlantic Ocean, through Kansas and Utah, northwest to the State of Washington.

Sonora alfalfa was developed by the Arizona, California, and Nevada Agricultural Experiment Stations and the U.S. Department of Agriculture and released in 1963. It is adapted to the lower desert areas of Arizona, California, and Nevada.

State and Federal plant breeders and entomologists are working to develop aphid resistant varieties adapted to other areas of the country. Ask your county agricultural agent or State agricultural experiment station for the latest information on resistant varieties of alfalfa.

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